In the Claims:

1. (Currently amended) A method for coating a biochip carrier with biologically or chemically functional materials, which comprises:

(a) providing a carrier having a surface which comprises photoactivatable groups located on predetermined areas of said carrier surface, an illumination matrix and a detector which comprises a light sensor matrix;

(b) activating said photoactivatable groups on at least a predetermined area of said carrier surface by ~~monitored and controlled~~ location-specific illumination of said predetermined area of said carrier surface using ~~an~~ said illumination matrix to generate an adjustable illumination pattern ~~which is controlled by means of a light sensor matrix~~;

(c) detecting said illumination pattern using said detector and optionally adjusting said illumination pattern;

~~(c)~~(d) binding said biologically or chemically functional materials or building blocks for said materials on said predetermined area of said carrier surface; and

~~(d)~~(e) repeating the activating, detecting and binding steps on the same or a different predetermined area of said carrier surface.

2. (Previously presented) The method of claim 1, wherein said illumination is with electromagnetic radiation selected from the group consisting of infrared, visible, ultraviolet and X-ray radiation.

3. (Previously presented) The method of claim 1, wherein said carrier is illuminated with radiation selected from the group consisting of pulsating radiation, coherent radiation, monochromatic radiation, parallel radiation and radiation which can be focused in different planes.

4. (Previously presented) The method of claim 1, wherein different predetermined areas are illuminated in parallel.

5. (Previously presented) The method of claim 1, wherein said illumination matrix is a reflection matrix having a controllably deformable mirror arrangement.

6. (Currently amended) The method of claim ~~4~~ 5, wherein said reflection matrix is selected from the group consisting of a light modulator with viscoelastic control layers and a light modulator with micromechanical mirror arrays.

7. (Previously presented) The method of claim 1, wherein said illumination matrix is prepared on a chip and comprises a light source selected from the group consisting of a laser array and a diode array.

8. (Previously presented) The method of claim 1, wherein said biochip carrier is an optically transparent carrier.

9. (Previously presented) The method of claim 1, wherein said biochip carrier has a surface selected from the group consisting of glass and plastics.

10. (Previously presented) The method of claim 1, wherein said predetermined area is from 1 μm^2 to 1 cm^2.

11. (Previously presented) The method of claim 1, wherein said predetermined area is surrounded by nonactivated or nonactivatable areas.

12. (Canceled).

13. (Previously presented) The method of claim 1, wherein said biologically or chemically functional materials react with biological substances.

14. (Currently amended) The method of claim 1, wherein said biologically or chemically functional materials are selected from the group consisting of nucleic acids, nucleotides, oligonucleotides, nucleic acid analogs, PNA, peptides proteins, amino acids, saccharides, cells, cell organelles, cell membrane preparations, viral particles, cell aggregates, allergens, pathogens, pharmacological active substances and diagnostic reagents.

15. (Previously presented) The method of claim 1, wherein said biologically or chemically functional materials are synthesized on said carrier in two or more stages from monomeric or oligomeric building blocks.

16. (Previously presented) The method of claim 1, wherein said biologically or chemically functional materials are a library comprising a multiplicity of different biologically or chemically functional materials.

17. (Previously presented) The method of claim 1, wherein said activating photoactivatable groups comprises cleaving a protective group on said at least a predetermined area of said carrier surface.

18. (Previously presented) The method of claim 1, wherein said illumination takes place at a rate of from 1/10000 to 1000 light patterns per second.

19-20. (Canceled herein).

21. (Previously presented) The method of claim 1, wherein said carrier is precalibrated using the illumination matrix and light sensor matrix.

22. (Previously presented) The method of claim 1, which further comprises at least partially removing materials bound on the carrier.

23. (Previously presented) The method of claim 22, wherein said materials bound on the carrier are removed in successive steps and used as building blocks for further synthesis of polymers.

24-26. (Canceled).

27. (Currently amended) A method for coating a biochip carrier with biologically or chemically functional materials, which comprises:

(a) providing a carrier having a surface which comprises photoactivatable groups located on predetermined areas of said carrier surface and a UV light source array;

(b) activating said photoactivatable groups on at least a predetermined area of said carrier surface by location-specific ~~exposure of said photoactivatable groups to a UV source selected from the group consisting of a diode array a UV laser array, and both a diode array and a UV laser array, wherein said UV source is controlled~~ illumination of said predetermined area of said carrier surface using said UV light source array to generate an adjustable exposure pattern;

(c) binding said biologically or chemically functional materials or building blocks for said materials on said predetermined areas of said carrier surface; and

(d) repeating the activating and binding steps on the same or different predetermined areas of said carrier surface.

28. (Currently amended) The method of claim 27, ~~wherein said location-specific exposure is controlled by means of~~ which further comprises detecting said illumination pattern using a light sensor matrix and optionally adjusting said illumination pattern.

29. (Previously presented) The method of claim 28, wherein said light sensor matrix is a CCD matrix.

30. (Previously presented) The method of claim 27, wherein said carrier is illuminated with radiation selected from the group consisting of pulsating radiation, coherent radiation, monochromatic radiation, parallel radiation and radiation which can be focused in different planes.

31. (Previously presented) The method of claim 27, wherein different predetermined areas are illuminated in parallel.

32. (Previously presented) The method of claim 27, wherein said biochip carrier is an optically transparent carrier.

33. (Previously presented) The method of claim 32, wherein said biochip carrier has a surface selected from the group consisting of glass and plastics.

34. (Previously presented) The method of claim 27, wherein said predetermined areas are from 1 μm^2 to 1 cm^2.

35. (Previously presented) The method of claim 34, wherein said predetermined areas are from 100 μm^2 to 1 mm^2.

36. (Previously presented) The method of claim 27, wherein said predetermined areas are surrounded by nonactivated or nonactivatable areas.

37. (Previously presented) The method of claim 27, wherein said biologically or chemically functional materials react with biological substances.

38. (Previously presented) The method of claim 27, wherein said biologically or chemically functional materials are selected from the group consisting of nucleic acids, nucleotides, oligonucleotides, nucleic acid analogs, PNA, peptides, proteins, amino acids, saccharides, cells, cell organelles, cell membrane preparations, viral particles, cell aggregates, allergens,

pathogens, pharmacological active substances and diagnostic reagents.

39. (Previously presented) The method of claim 27, wherein said biologically or chemically functional materials are synthesized on said carrier in two or more stages from monomeric or oligomeric building blocks.

40. (Previously presented) The method of claim 27, wherein said biologically or chemically functional materials are a library comprising a multiplicity of different biologically or chemically functional materials.

41. (Previously presented) The method of claim 27, wherein said activating photoactivatable groups comprises cleaving a protective group on said predetermined areas of said carrier surface.

42. (Previously presented) The method of claim 27, wherein said illumination takes place at a rate of from 1/10000 to 1000 light patterns per second.

43. (Previously presented) The method of claim 42, wherein said illumination takes place at a rate of from 1/10 to 100 light patterns per second.

44. (Previously presented) The method of claim 27, which further comprises at least partially removing materials bound on the carrier.

45. (Previously presented) The method of claim 44, wherein said materials bound on the carrier are removed in successive steps and used as building blocks for further synthesis of polymers.

46. (Previously presented) The method of claim 1, wherein said light sensor matrix is a CCD matrix.

47. (Currently amended) The method of claim ~~9~~ 1, wherein said ~~semiconducting material is~~ biochip carrier has a surface selected from the group consisting of silicon, germanium arsenide and gallium arsenide.

48. (Previously presented) The method of claim 9, wherein said glass is quartz glass.

49. (Previously presented) The method of claim 10, wherein said predetermined area is from 100 μm^2 to 1 mm^2.

50. (Previously presented) The method of claim 18, wherein said illumination takes place at a rate of from 1/10 to 100 light patterns per second.

51. (Previously presented) The method of claim 22, wherein said materials bound on the carrier are selected from the group consisting of nucleic acids, nucleic acid analogs and proteins.

52. (Previously presented) The method of claim 23, wherein said polymers are nucleic acid polymers.

53-55. (Canceled herein).

56. (Currently amended) A method for coating a biochip carrier with biologically or chemically functional materials, which comprises:

(a) providing a carrier having a surface which comprises photoactivatable groups located on predetermined areas of said carrier surface and a UV light source array;

(b) activating said photoactivatable groups by ~~monitored and controlled~~ location-specific ~~exposure of said photoactivatable groups to a UV source selected from the group consisting of a diode array, a UV laser array, and both a diode array and a UV laser array, wherein said UV source is controlled~~ illumination of said predetermined area of said carrier surface using said UV light source array to generate an adjustable exposure pattern ~~by means of a light sensor matrix~~;

(c) detecting said illumination pattern using a detector and optionally adjusting said illumination pattern;

~~(c)~~(d) binding said biologically or chemically functional materials or building blocks for said materials on said predetermined areas of said carrier surface; and

~~(d)~~(e) repeating the activating and binding steps on the same or different predetermined areas of said carrier surface,

wherein said UV light source array is selected from the group consisting of a diode array, a UV laser array, and both a diode array and a UV laser array.

57. (New) A method of claim 27 wherein said UV light source array is selected from the group consisting of a diode array, a UV laser array, and both a diode array and a UV laser array.